CLAIMS

I claim:

1. A turbine vane, comprising:

a generally elongated hollow airfoil having a leading edge, a trailing edge, a pressure side, a suction side, a first end adapted to be coupled to a shroud assembly, and a second end opposite the first end adapted to be coupled to a manifold assembly;

a serpentine cooling path and formed from at least a first inflow section and a first outflow section, the first outflow section in communication with the first inflow section and extending from a first turn generally toward the first end of the generally elongated hollow airfoil;

at least one inlet orifice in the first inflow section of the serpentine cooling path at the first end of the generally elongated hollow airfoil;

at least one exhaust orifice in the trailing edge of the generally elongated hollow airfoil and coupled to the serpentine cooling path for exhausting cooling fluids from the serpentine cooling path;

at least one leading edge cooling path positioned proximate to the leading edge;

at least one metering rib defining a barrier between a portion of the first inflow section and the at least one leading edge cooling path, wherein the at least one metering rib includes at least one metering orifice; and

wherein the at least one metering orifice in the metering rib is sized to regulate flow of cooling fluids through the at least one leading edge cooling path and into a manifold assembly.

2. The turbine vane of claim 1, wherein the at least one leading edge cooling path comprises three leading edge cooling paths separated by ribs extending substantially parallel to the leading edge and wherein each of the three leading edge cooling paths includes at least one metering orifice in the metering rib for providing a pathway for gases to flow from the first inflow section to each of the three leading edge cooling paths.

3. The turbine vane of claim 2, wherein the metering orifices have substantially equal cross-sectional areas.

4. The turbine vane of claim 2, wherein at least some of the metering orifices have different cross-sectional areas.

5. The turbine vane of claim 1, wherein the at least one leading edge cooling path is a divergent cooling path such that a first cross-sectional area of the divergent cooling path at a first end of the at least one leading edge cooling path proximate to the first end of the generally elongated hollow airfoil is smaller than a second cross-sectional area of the at least one leading edge cooling path proximate to the second end of the generally elongated hollow airfoil.

6. The turbine vane of claim 1, wherein the first inflow section of the serpentine cooling path is a convergent cooling path having a first cross-sectional area at the first end of the generally elongated hollow airfoil that is greater than a second cross-sectional area at the second end of the generally elongated hollow airfoil.

7. The turbine vane of claim 1, wherein the serpentine cooling path further comprises a second inflow section positioned between the first outflow section and the trailing edge and in communication with the first outflow section.

8. The turbine vane of claim 1, wherein the serpentine cooling path further comprises a plurality of trip strips.

9. The turbine vane of claim 1, wherein the at least one metering orifice comprises a plurality of metering orifices in the metering rib.

10. The turbine vane of claim 9, wherein at least a portion of the plurality of metering orifices have different cross-sectional areas.

11. The turbine vane of claim 1, wherein the metering rib is adapted to control flow of a cooling fluid through the turbine vane so that a sufficient amount of cooling fluid is passed through the serpentine cooling path to cool portions of the trailing edge.

12. A turbine vane, comprising:

a generally elongated hollow airfoil having a leading edge, a trailing edge, a pressure side, a suction side, a first end adapted to be coupled to a shroud assembly, and a second end opposite the first end adapted to be coupled to a manifold assembly;

a serpentine cooling path and formed from at least a first inflow section, a first outflow section, and a second inflow section, the first outflow section in communication with the first inflow section and extending from a first turn generally toward the first end of the generally elongated hollow airfoil, the second inflow section positioned between the first outflow section and the trailing edge and in communication with the first outflow section;

at least one inlet orifice in the first inflow section of the serpentine cooling path at the first end of the generally elongated hollow airfoil;

at least one exhaust orifice in the trailing edge of the generally elongated hollow airfoil and coupled to the serpentine cooling path for exhausting cooling fluids from the serpentine cooling path;

at least one divergent leading edge cooling path positioned proximate to the leading edge;

at least one metering rib defining a barrier between a portion of the first inflow section and the at least one leading edge cooling path, wherein the at least one metering rib includes at least one metering orifice;

wherein each of the plurality of metering orifices in the metering rib are sized to regulate flow of cooling fluids through the at least one divergent leading edge cooling path and into a manifold assembly; and

wherein the at least one divergent leading edge cooling path has a first cross-sectional area at the first end of the generally elongated hollow airfoil that is smaller

than a second cross-sectional area at the second end of the generally elongated hollow airfoil.

13. The turbine vane of claim 12, wherein the at least one leading edge cooling path comprises three leading edge cooling paths separated by ribs extending substantially parallel to the leading edge and wherein each of the three leading edge cooling paths includes at least one metering orifice in the metering rib for providing a pathway for gases to flow from the first inflow section to each of the three leading edge cooling paths.

14. The turbine vane of claim 13, wherein the metering orifices have substantially equal cross-sectional areas.

15. The turbine vane of claim 13, wherein at least some of the metering orifices have different cross-sectional areas.

16. The turbine vane of claim 12, wherein the first inflow section of the serpentine cooling path is a convergent cooling path having a first cross-sectional area at the first end of the generally elongated hollow airfoil that is greater than a second cross-sectional area at the second end of the generally elongated hollow airfoil.

17. The turbine vane of claim 12, wherein the serpentine cooling path further comprises a plurality of trip strips.

18. The turbine vane of claim 12, wherein the at least one metering orifice comprises a plurality of metering orifices in the metering rib.

19. The turbine vane of claim 18, wherein at least a portion of the plurality of metering orifices are different cross-sectional areas.

20. The turbine vane of claim 12, wherein the plurality of metering orifices are adapted to control flow of a cooling fluid through the turbine vane so that a sufficient amount of cooling fluid is passed through the serpentine cooling path to cool portions of the trailing edge.